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contains the quantity of lime which characterizes the better class of Kentucky soils, it is supposed, that, even if soluble phosphatic manures are applied, the superphosphate becomes again insoluble by taking up a molecule of lime. It is therefore an interesting question as to the means by which the lime phosphate enters the plants. It may be that the solution is effected through the action of the various humic acids of the soil, or it may arise from some specific change which takes place at the contact of the soil with the roots. It is evident that this point requires precise determination, for on it will depend further experiments as to the methods of applying phosphatic manures.

There is yet another point on which we need experiments. Many of our rock phosphates, especially those which are distinctly bedded, contain low percentages of phosphatic matter. Many of our lime phosphates contain crystals of apatite and calcite so intermingled that it is not possible to separate them; yet from these deposits it will be easy to produce a mixture of lime carbonate and lime phosphate containing from 10 to 20 per cent of phosphoric acid. The value of such material for manure has never been determined. If it can be used in a way which will give to the fields the full value for both the lime and the phosphorus, it will open a way for an extensive production of cheap fertilizers.

The foregoing considerations give the general results of the preliminary inquiry into phosphatic manures, of which Dr. Penrose's work forms a part. Before we go further into these studies, I much desire to have the criticism and advice of others who have considered this subject. It is with this view that I have ventured to give in the foregoing pages an account of the aim of the inquiries I have in hand. The questions are at once chemical and geological, and demand much co-operation for their solution. Much of the work of searching for the unknown phosphatic deposits of this country will necessarily have to be undertaken by local students of geology or by commercial explorers in search of such deposits. Unfortunately, the unfamiliar aspect of the various forms of phosphatic deposits will make this task under any circumstances difficult. There is no substance of equally wide diffusion among those of considerable commercial importance, which, in the present state of popular knowledge, so readily escapes detection as lime phosphate.

#### BOOK-REVIEWS.

*Social Progress.* By DANIEL GREENLEAF THOMPSON. London and New York, Longmans, Green, & Co. 8°. \$2.

THIS work is an inquiry into the foundations of social life and the means and methods of progress. The first part deals with the conditions of social progress; the second, with the means of promoting it. The work contains nothing that is specially new or striking, but is rather a restatement of the general principles of free government and social improvement as viewed from the standpoint of an evolutionist. The author's style is clear and flowing, so that the book is easy and agreeable to read; and there is much in it that thinkers of all schools will agree with. Mr. Thompson begins with a discussion of liberty and law, which he declares to be inseparable. All men, he maintains, must have equal rights and equal protection under the law; but as men and classes differ in power, the maintenance of equal rights has always been difficult. In former times the difficulty arose chiefly from military ambition and priestcraft, while in our time the danger that threatens us is that of a plutocracy. The main defect in this portion of Mr. Thompson's work is its inadequate recognition of the moral element in society. He does indeed recognize it, but he gives an altogether insufficient account of it. He bases society on self-interest alone, and reduces even benevolence itself to selfish prudence. He inquires why it is that we take pleasure in promoting the good of others, and answers the question thus: "Upon investigation we cannot fail to be led to the conclusion that the foundation for this is the selfish consideration of how delightful it would be if everybody else besides ourselves were animated by the desire and purpose of helping instead of hurting his neighbor" (pp. 63, 64): in other words, we do good to others in order that they may do good to us. The second part of Mr. Thompson's treatise treats of radicalism and conservatism, of the need of frequent change in order that society may progress,

and of the best way of effecting such changes. It offers many interesting remarks on the need of care in the formation of opinion, on the folly of attempting political changes before the public is ready for them, and on other matters incidental to the subject. On the whole, this part of the work, though dealing with less fundamental questions than the first part, is more satisfactory.

*Scientific Religion.* By LAURENCE OLIPHANT. Buffalo, Charles A. Wenborne. 8°. \$2.50.

WHY the doctrine taught in this book should be called scientific we do not know, for its characteristics are all of the opposite kind. Mr. Oliphant sees, as most other men do, that the old religious views will no longer suffice, and he undertakes in these pages to furnish a substitute. He believes in communication with departed spirits, who will teach us many important truths and render us invaluable aid if we will but listen to them. He holds that "the unseen world teems with intelligences, whose action upon this one is very direct, and is governed by laws." "This," he declares, "is a fact of my own personal experience." Spirit, he maintains, is only a higher form of matter, and the spirits in the unseen world communicate with us by the "interlocking of atoms." It is sad to learn, however, that the unseen spirits are not all good, and that the bad ones exert a baneful influence upon us, some of our worst impulses being due to their "infestation." Insanity, also, is due to them; and "when, therefore, we read in the Gospels of the cures by Christ of men possessed by devils, the expression is literally accurate." It depends on us, however, whether we will be influenced by the good spirits or the bad ones; and, in order to obtain the highest favors from the spirit world, we must become "bisexual." Adam, we learn, before the fall, was bisexual, and though his feminine part was separable from the masculine, the two were still one, this being possible in the case of Adam and Eve because their atomic structure was "four-dimensional." Christ, also, was bisexual, and, in fact, came into the world to restore the bisexual principle. Such is the stuff that Mr. Oliphant offers us as a new religion, and he expects men to abandon the Christianity of the churches for this! A large part of his book is devoted to a mystical interpretation of the Bible, and the rest is mainly occupied with the doctrine of spirits. We regard the appearance of this work and others of a similar character as one of the strangest signs of the times, and as indicative of a mental aberration that is truly amazing.

*German Commercial Correspondence.* By JOSEPH T. DANN. London and New York, Longmans, Green, & Co. 16°. 80 cents.

THIS book is of the *multum in parvo* kind, containing a great deal in a small compass. Its author was at one time assistant master in University College School in London, and it is intended not only for the use of schools and classes, but also for self-tuition. Specimens of letters are given for translation from German into English and from English into German. Copious notes, sufficient to enable the student to understand and render every idiom, are supplied, being placed at the end of the book, so that students may learn them by heart before translation is attempted. At the end of each section, subjects for writing letters similar to those contained therein are given, by way of exercises, so as to enable students to turn the study of the section itself to account. Copious vocabularies, German-English and English-German, are appended, embodying all the words which the student cannot be expected to have acquired in an elementary training. The idioms and peculiarities of the language have received special attention, so that the student may know not only what to do, but what to avoid.

*French Commercial Correspondence.* By ELPHEGE JANAU. London and New York, Longmans, Green, & Co. 16°. 80 cents.

THIS and its companion, the "German Commercial Correspondence," mentioned above, are constructed on such a plan that they may be used separately or together. The substance of the letters, in French or German, forming the first part of each section, is the same, and the English letters forming the second part are identical in the two volumes. In the third part are subjects for letters,